

# Heart Failure

## RIGHT VENTRICULAR ELECTRICAL REMODELING AND ARRHYTHMOGENIC SUBSTRATE IN MONOCROTALINE-INDUCED RAT PULMONARY HYPERTENSION AND RIGHT VENTRICULAR FAILURE: SIGNIFICANCE OF INCREASED ACTION POTENTIAL DURATION DISPERSION

Poster Contributions  
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**Background:** Right ventricular (RV) dysfunction caused by severe pulmonary hypertension (PH) is associated with high mortality due to RV failure. However, some patients could suffer from sudden cardiac death (SCD). We hypothesize that PH can cause RV arrhythmogenesis leading to SCD.

**Methods:** To investigate arrhythmogenesis in PH, optical mapping analysis (OMP) with electrophysiological study (EPS) and pathological examination were performed in the monocrotaline (MCT)-induced rat PH model. Rats were injected with MCT (60 mg/kg), and OMP was performed in isolated Langendorff-perfused hearts.

**Results:** OMP revealed abnormal RV conduction delay and abnormal pattern in PH. Impaired action potential duration dispersion (APDd), an index of myocardial repolarization instability, was observed only in RV with PH. EPS demonstrated that lethal arrhythmias were induced by burst pacing to RV when deteriorated APDd became evident. This arrhythmogenesis was inhibited by combination treatment with sildenafil and beraprost (SIL+BERA). RT-PCR showed mRNA upregulation of type I collagen and downregulation of connexin43 in RV at 5 weeks after MCT injection. Immunohistochemistry also revealed connexin43 degradation in the RV with PH. In contrast, connexin43 was well preserved, and no lethal arrhythmias were induced by burst pacing to RV in the absence of PH after SIL+BERA.

**Conclusions:** RV electrical remodeling including impaired APDd causes arrhythmogenesis in PH, potentially associated with SCD due to PH.

